U.S. DEPARTMENT OF COMMERCE
National Telecommunications & Information Administration

Evaluation of the
Telecommunications and Information Infrastructure Assistance Program

Case Study Report

Project Rural Urban Network (RUN)
95062

Louisville, Kentucky

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Site Visitors: Joan Michie and Nicole Bartfai

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PREFACE

On behalf of the National Telecommunications and Information (NTIA), I am pleased to share the following report that is one of a series of case studies conducted on grants awarded by the Telecommunications and Information Infrastructure Assistance Program (TIIAP) in 1994 and 1995. The case studies are part of the program's evaluation effort designed to gain knowledge about the effects and lessons of TIIAP-funded projects. NTIA contracted Westat, a research and consulting firm, to perform an independent evaluation of the program's first two years of grants. The evaluation consisted of a mail survey of 206 grant recipient organizations and in-depth case studies of selected projects. In February, 1999, the Commerce Department released Westat's evaluation report.

The projects selected for the case studies cover a broad range of program types and sizes, planning grants as well as demonstration grants, and they show varying degrees of implementation, sustainability, and replication. Westat selected the projects to represent a cross-section of all projects funded in the program's first two years. Specific selection criteria included geographic region, target population, project application area, project category, and size of award. To conduct each case study, Westat reviewed all project files, including progress reports and the final report, and conducted site visits. The site visits consisted of project demonstrations and interviews with project staff, representatives of partner organizations, and project end users.

NTIA thanks the case study participants for their time and their willingness to share not only their successes but their difficulties, too. Most of all, we applaud their pioneering efforts to bring the benefits of advanced telecommunications and information technologies to communities in need. We are excited about the case studies and lessons they contain. It is through the dissemination of these lessons that we extend the benefits of TIIAP-funded projects nationwide.

We hope you find this case study report valuable and encourage you to read other TIIAP case studies. You may obtain additional case studies and other TIIAP publications, including the final Westat evaluation report, through the NTIA web site (www.ntia.doc.gov)_or by calling the TIIAP_office at (202) 482-2048. We also are interested in your feedback. If you have comments on this case study or suggestions on how TIIAP can better provide information on the results and lessons of its grants, please contact Francine E. Jefferson, Ph.D. at (202) 482-2048 or by email at fjefferson@ntia.doc.gov.

Larry Irving
Assistant Secretary for Communications and Information

TIIAP CASE STUDY

Project Rural Urban Network (RUN)

EXECUTIVE SUMMARY

Project Rural Urban Network (RUN) was established for three purposes: one is to install a 17-mile fiber optic network that will link the city government of Louisville, Kentucky; Jefferson County Public Schools (JCPS); the library system; the science center; the zoo; and Bellarmine College, a private institution of higher education. This is being done by sharing resources, including financial, and installing one cable system that will support all partners.

A second purpose of the project is to provide services to all students and citizens via the cable. One area of the city that is specifically targeted for the TIIAP project is the Enterprise Community, an inner-city area that is experiencing a high level of poverty.

The third project purpose is to reach out to Pike County, a very rural area at the other end of the state. The approach used for this component of the project is the installation of teleconferencing classrooms in Pike County and Louisville.

The project was designed through a FY 1994 TIIAP planning grant to the Jefferson County Public Schools. During the planning process, school staff learned that other local organizations were in the process of developing their own networks. The city government had already installed fiber optics to connect several buildings that were in close proximity. The city had plans to extend their network to other buildings. The school and the city realized that they could merge their efforts and thus avoid duplication of effort and cost.

Through Project RUN, much fiber optic cable has been installed. However, more cable needs to be installed before the full benefits of the system can be realized. Altogether, 23 JCPS sites on 19 campuses are expected to be connected as a part of the TIIAP project.

Teachers from all of the Project RUN schools have received a 3-hour training session entitled Introduction to Instructional Uses of the Internet. The sessions were conducted at both the local school locations and the district technology training facility. The 83 participating teachers received training in the use of search engines and instructional applications in all subject areas. In addition, they learned about the school district's acceptable use policy.

The library had been scheduled to link up with the city, but the manager for computer services for the library estimated that they were hooked up 1 year ahead of time as a result of the TIIAP project. The library has always been strong in educational outreach. In the past, librarians were sent to remote locations. As a result of Project RUN, services will be provided through teleconferencing, which has been tried on two occasions.

Three teleconferencing centers were already located in the Louisville area, and one center was installed in Pike County as a part of TIIAP. These centers were used by the Louisville Zoo during the winter and spring of 1997 to provide 10 classes to students in Pike County. A second series of 9 classes was provided during the fall of 1997.

Lessons learned by the project area as follows:

- Sharing resources can avoid duplication of expensive cabling costs. For each section of the cable, the partners had to decide whose budget would be used to install and later maintain it. Working this out in advance took time and careful negotiation, but it was worth the effort in the end.

- The political and legal aspects of the project rather than the technical produce the main problems. This was the advice given by the expert consultant to the planning grant and staff said that it proved to be very accurate.

- Installing the fiber optic cable only takes 6-8 weeks. Getting the contract signed is what takes the time.

- Read legal contracts very carefully. Legal counsel is needed.

OVERVIEW

Purpose and General Approach

Project RUN was established for three purposes: one is to install fiber optic cable that will link the city government of Louisville, Kentucky; Jefferson County Public Schools (JCPS); the library system; the science center; the zoo; and Bellarmine College, a private institution of higher education. This is being done by sharing resources, including financial, and installing one cable system that will support all partners.

A second purpose of the project is to provide services to all students and citizens via the cable. One area of the city that is specifically targeted for the TIIAP project is the Enterprise Community, an inner-city area that is experiencing a high level of poverty.

The third project purpose is to reach out to Pike County, a very rural area at the other end of the state. The approach used for this component of the project is the installation of teleconferencing classrooms in Pike County and Louisville.

According to the TIIAP proposal, the ultimate, long-term goal is to have a network that will:

- "connect all classrooms, school offices, district central offices, the Kentucky Department of Education, community agencies, and all areas of Kentucky;

- provide voice, data, and video communications at all levels;

- guarantee teachers, students, and all citizens access to on-line database services and instructional resources;

- link students and community members to other learners and to distance learning opportunities in other cities and states;

- include gateways to a variety of on-line services;

- give teachers, students, and community members access to businesses and institutions of higher education, and peer-to-peer communication at all levels of the NII; and

- provide alternative methods of delivering instruction to learners with special needs and workers who require retraining."

The fiber optic cable will be distributed through parts of the county. All partners will be able to use the services. The basic design and coordination of activities are being done by the schools and the City of Louisville.

Description of Grant Recipient and Project Partners

Grant Recipient. Jefferson County Public Schools (JCPS) compose the 24th largest school district in the country and encompass the city of Louisville and the surrounding countryside. The district serves over 92,000 students in grades K-12 and an additional 4,000 in pre-kindergarten and adult education programs. Over 44 percent of the students are considered economically disadvantaged since they qualify for free or reduced-price lunches. All 5,756 teachers in the district are certified, and more than 82 percent have a master's degree or higher.

The district has 87 elementary schools, 23 middle schools, 20 high schools, and 21 other learning centers. Millions of dollars would be needed to cable the entire district, so for TIIAP, the district decided to build a demonstration network in the Enterprise Community, which has a high level of poverty. Altogether, 21 JCPS sites on 16 campuses are expected to be connected as a part of the TIIAP project.

JCPS has been on the cutting edge of technology by putting computers in classrooms, labs, and libraries. As of the 1997-98 school year, JCPS reports a student-to-computers ratio of 6.4:1. Some schools also allow students to check out laptops for at-home use. Since 1995, JCPS has put into place annual computer assessments in grades P4 (Grade 3), 5, 8, and 10. It measures students' proficiency in five areas: keyboarding, word processing, databases, spreadsheets, and legal/ethical issues. It measures the students' skills to see if they are on target with Jefferson County's Computer Skills Continuum. In schools that are networked, including those on the Project RUN fiber, information retrieval/telecommunications skills also are assessed.

JCPS recognizes the need for overall community involvement in school improvement. More than $41 million has contributed to the district through more than 1,100 partnerships over the past 10 years.

Specific staff from JCPS work on the project:

- The Executive Director of Educational Technology serves as the TIIAP project director. He is a member of the planning committee that is implementing the statewide telecommunications system and electronic network. Prior to coming to Louisville he had worked in a school district in Iowa, where fiber optic cable has been installed throughout the state.

- The Voice and Data Communications Specialist serves as the project coordinator. He is responsible for designing, maintaining, and specifying all voice and data communications facilities in the district and maintaining all terminal, printer, and microcomputer hardware.

- The 12 resource teachers of the Computer Education Support Unit provide training and ongoing daily support to users involved in the project.

In addition, a consultant with expertise in networking will serve as the project evaluator.

Project Partners. The City of Louisville already had a fiber optic cabling project underway when the TIIAP project was funded. Several government buildings within a few city blocks had already been linked up.

The Louisville Free Public Library has a main library and 14 branches with about 300,000 patrons, and it is jointly funded by Jefferson County and the City of Louisville. The City of Louisville is the fiscal agent for the Louisville Free Public Library. The library has been automated since 1983 with several upgrades occurring over the years. At the time of the site visit, it was in the midst of changing its infrastructure. All buildings are being completely rewired with Category 5 wire, which provides great speed. In addition, the buildings are being connected by fiber optics; a part of this activity is a piece of the TIIAP project. It will be the largest frame relay network in Kentucky. The library also is in the process of ordering 400 PCs, Windows NT, which will replace a mid-range mainframe system.

The Louisville Science Center, the largest hands-on science center in Kentucky, emphasizes the application of science and mathematics concepts in daily life situations through hands-on activities. More than 70 percent of the visitors are families, who come from all over the state. "The World We Create," an exhibit at the center, includes four interactive communication exhibits, which enable students and citizens throughout the state to take an "electronic field trip" to the Science Center.

Bellarmine College is an independent, coeducational liberal arts college with 1,267 full-time undergraduate students and 1,139 part-time undergraduate and graduate students. It is in the process of building a $8.5 million library with state-of-the-art information and telecommunications technology, which will be available to TIIAP project partners. Also, the campus is adjacent to several JCPS schools and city buildings, and the project has run the fiber optic cable across the campus. However, the college has not tapped into it yet because a direct line to all the local organizations has become less necessary with the advent of the Internet. Bellarmine College put in its own T1 line for Internet access.

Pike County is in the Appalachian Mountains, at the opposite end of Kentucky from Louisville. With 755 square miles, it is the largest county in the state, but the population is only 72,000. The Pike County School System serves over 12,000 students in 22 elementary, 1 middle, and 7 high schools. Many of the schools are small and can offer only the basic required courses. The school system has a technology van that travels to various parts of the county on a regular basis to give citizens hands-on experiences with new technologies. It also has 31 school technology coordinators. Pike County was the home of the Kentucky Governor at the time the project began.

Project Costs

The total project cost is $1,972,225, of which $800,000 came from federal sources. JCPS contributed $339,197, and the remaining $833,028 was contributed by the project partners. Most of the federal share went to the cost of the fiber; all the groups involved contributed staff time and in-kind contributions.

PROJECT CONTEXT

Community Description

The Louisville Chamber of Commerce brought together representatives from the city, county, and state governments as well as local big business to look for niches in which the city could stand out as a means of attracting further growth and development. They called their vision, "A Community of Access," and decided to focus on three service areas: health, distribution, and telecommunications. In the area of health,

Louisville has been working to improve specialized emergency services such as heart and liver transplants. Distribution is already central to Louisville's economy, with UPS being their leading employer. Also, it is recognized for industry, which has flourished because of the central location and easy access to the Ohio River. Large corporations such as General Electric and Sears have headquarters in Louisville. Project RUN is one mechanism that the city is using to develop its telecommunications capabilities. The TIIAP project director served on the telecommunications committee of this endeavor.

The city of Louisville is a small section of Jefferson County but houses most of the population. Of the 664,937 people in Jefferson County, approximately 81 percent are white, 17 percent are black, and 2 percent are other. Approximately 95 percent live inside urbanized areas as indicated by the 1990 U.S. census data. Therefore, many of the same issues and concerns have taken root in Louisville as in other urban areas. Louisville's Empowerment Zone/Enterprise Communities cover 18 census tracts in the West End and three neighborhoods on the East Side near downtown. These areas have been targeted for funding and tax-exempt bond financing to create jobs, develop a skilled workforce, improve education, and provide training opportunities for residents in these areas.

In contrast to Louisville, Pike County has remained extremely rural as it sits in the heart of the Appalachian Mountains. The lack of growth and opportunity is witnessed in the steady decline of population over the past 20 years. There is limited ethnic diversity in Pike County, and approximately 99 percent of the 72,583 citizens are white. It is the largest county in the state in area, but much of the terrain is mountainous. It sits on the border of West Virginia and is best known for the Hatfield and McCoy feud. As evidenced by "Hillbilly Days," a celebration of their cultural background in Pike County, many of the residence hold on to their traditions and lifestyles.

Status of Telecommunications/Information Infrastructure Environment Prior to the TIIAP Project

Prior to the TIIAP grant, fiber optic lines in Louisville connected several city government buildings in the downtown area. The government campus had started to use fiber optics as a cost-effective way to communicate and manage the city government.

The Kentucky Tele-Linking Network (KTLN) uses hubs at university sites to transmit interactive audio and video throughout the state. There are 60 K-12 sites associated with a hub, and the hubs are then connected to each other through a central hub located in Frankfort, KY. The live simultaneous audio and video has allowed for an exchange of ideas and new learning opportunities between teachers and students on all education levels.

In 1994, JCPS was identified as an exemplary site for training teachers to use technology in a study commissioned by Congress' Office of Technology Assessment.

PROJECT IMPLEMENTATION

Activities/Milestones That Occurred Prior to the TIIAP Grant Period

In 1992, The Jefferson County Public Schools (JCPS) established a district technology committee to determine priorities in education technology. Members of the committee included district administrators, principals, teachers, and community representatives. Accomplishments of the committee included the following:

- Minimum standards for hardware, software, and wiring were established.

- An inventory of hardware and software was conducted.

- The district provided $2.8 million, which was matched 100 percent by the state for the purchase of hardware and software.

- Access to the Internet for the schools was accomplished through a partnership with the University of Louisville, which provided a physical connection to the University node.

- A Class B license was obtained for providing Internet addresses for all district staff and students.

- The district was selected as one of eight KETS (Kentucky Education Technology System) Technology Innovation Centers by the state of Kentucky. The purpose of these centers is to demonstrate creative uses of technology and to serve as a site for testing instructional technologies.

- Individual school plans were developed for defining educational needs and technology solutions. As part of the planning process, each school established a technology team composed of administrators, teachers, parents, students, and community members. In addition, parents, students, teachers, administrators, and other staff were surveyed about educational needs, expertise with technology, training needs, and attitudes toward technology.

In FY 1994, JCPS received a TIIAP planning grant for $10,695. The total budget for the planning project was $58,893. One purpose of the planning grant was to design a new communications infrastructure for the schools that would have the capacity to "1) transmit voice, data, and video; 2) interconnect with other statewide, national and international networks; 3) support the National Information Highway; and 4) provide equity of access to all residents." In addition, the system had to include an alternate source of access and emergency procedures so that communications services would not be disrupted. Another purpose of the planning grant was to evaluate available transmission options by visiting several sites and vendors to determine the systems' cost effectiveness and capacity for upgrades and improvements. The final facet of the planning grant was the design of a training plan for integrating telecommunications into the educational curriculum.

A high-powered expert in all aspects of computer networking was a consultant to the planning project. It was the expert's recommendation that the community install its own fiber optic network and become its own telecommunications service provider because it would deliver higher performance and be cheaper in the long run than tariffed services. Also, as needs change over time, the fiber optic cable could continue to be used with only the equipment at the end becoming obsolete. This recommendation was reinforced by the visit that JCPS staff made to Iowa, which has a statewide fiber optic network. Because it would take a considerable amount of time and money to install the complete fiber optic network, it was decided that the district also would use a public network with services provided by BellSouth in the interim.

As a part of the planning grant, staff in the JCPS Computer Education Support (CES) Unit attended training activities at Indiana University's Center of Excellence in Education. They received Internet training in connectivity, search and retrieval, K-12 applications, and access strategies. The staff also attended a national educational telecommunications conference to determine best practices for instructional uses of telecommunications services and produced a resource guide for teachers on best practices.

During the planning process, school staff learned that other local organizations were in the process of developing their own networks. The city government had already installed fiber optics to connect several buildings that were in close proximity. The city had plans to extend their network to other buildings. The school and the city realized that they could merge their efforts and thus avoid duplication of effort and cost. They entered into a partnership which eventually included the Louisville Science Center, Bellarmine College, and Pike County Schools. The Louisville Free Public Library, which had planned to be linked to the city's fiber network, later became a partner as well.

Activities/Milestones That Occurred During the TIIAP Grant Period

The major project activity is the construction of the fiber optic network. Project RUN is installing a fiber optic wide area network (WAN), with a single point of access in every building. For schools that have not been cabled, services are purchased from the phone company. As more schools receive fiber optic cabling, the telecommunications costs will decline. According to project staff, an advantage of the fiber optic cable compared to a T1 line is that it can handle better quality full-motion broadcast-quality video.

Throughout the project, regular meetings of the Project RUN Steering Committee were held. The Committee consisted of representatives of each of the partners located in Louisville. At these meeting, it was determined exactly where each segment of the cable would be run and who would be responsible for paying and maintaining each segment.

Three teleconferencing centers were already located in the Louisville area and one was installed in Pike County as a part of the TIIAP project. (Pike County has two additional teleconferencing facilities that were funded through other sources.)

On October 24, 1996, the Instructional Committee of Jefferson County Public Schools held a meeting at the Male High School, where teleconferencing equipment is housed. Several teachers in Pike County participated in the meeting via teleconferencing. Pike County was looking for institutions to do long-distance teaching with them. A representative from the Louisville Zoo attended the meeting and offered its services. Classes later provided by the zoo are discussed in the project accomplishments section.

Teachers from all of the Project RUN schools have received a 3-hour training session entitled Introduction to Instructional Uses of the Internet. The sessions were conducted at both the local school locations and the district technology training facility. The 83 participating teachers received training in the use of search engines and instructional applications in all subject areas. In addition, they learned about the district's acceptable use policy.

The project has received two extensions. At the time of the site visit, it was considering asking for a third.

Steps Taken to Sustain Project Activities Beyond the TIIAP Grant Period

The district has put together a $30 million project for putting a local area network into individual schools. Funding for the project is expected to come from the following sources:

KETS (Kentucky Education Technology System)	$1.1 million/yr X 5 yrs.	= $5.5 million
Bonds	$4 million/yr x 5 yrs.	= $20.0 million
E-rate discount	$4.6 million	= $4.6 million
Total		$30.1 million

Activities That Occurred Following the TIIAP Grant Period

Not applicable. The project was still in operation at the time of the site visit.

Problems

The project took longer than anticipated. Aspects that took a long time were finalizing contracts, deciding where to lay the cable (above or below ground), processing easements, and bargaining for a contractor.

There were delays in approval of various aspects of the project by the school system, which were related to an internal political situation. The city network also experienced delays at various times along the way. Typically, when one partner experienced problems, the others have taken responsibility to try to keep the project moving ahead.

The zoo encountered a few problems in conducting the classes via teleconferencing equipment. Scheduling time for the necessary connections is very complex. Some classes had to be cancelled because of snow days during the winter months and then had to be rescheduled. On two occasions, the hookup was delayed.

At first it was difficult to get students to use the teleconferencing equipment appropriately, such as speaking up, pushing the buttons to speak, and interacting with people at the other site. Practice sessions helped the students to feel more comfortable. This meant that the students had to be bused to the facility on two separate days, one to learn how to use the equipment and the second to actually participate in the class.

PROJECT ACCOMPLISHMENTS AND IMPACT

Technology-Related Accomplishments

Through the TIIAP project, much fiber optic cable has been installed. However, more cable needs to be installed before the full benefits of the system can be realized.

The library had been scheduled to link up with the city, but the manager for computer services for the library estimated that they were hooked up 1 year ahead of time as a result of the TIIAP project. During the week of the site visit, InfoTrak had been put on the web server. This will enable users to get to the catalog by going on the web without dialing up. In addition, databases that the library is licensed to provide are available through the web. This year the library put in a new system in which patrons can review their own records. This service is available for students.

The library has always been strong in educational outreach. However, now a technological facet is being added. The computer services manager said this would enable services to be provided in a more seamless way.

With fiber, one can do high-quality full video and sound and live interaction. Two preliminary teleconferencing seminars on storytelling have been conducted to show what can be done. A puppet-making seminar was scheduled for the week after the site visit and another workshop entitled “Poetry-Yuk” also was planned. In the past, librarians were sent to remote locations.

Impact of Project on Direct End Users

A trial run by the zoo of the provision of classes via teleconferencing equipment was held on December 17, 1996. Staff from the Louisville Zoo held an introductory class for Pike County teachers. In the class, the zoo presented its mission, including its role as the State Zoo of Kentucky and information about the goals of the Kentucky Education Reform Act. A sample lesson with animals was given and the zoo mentioned subjects that could be used in a class. The teachers were asked to identify their needs. Also, there was a discussion of how to help students interact with the instructors and what information would be useful to have in advance of a class such as students' names. During winter and spring of 1997, the zoo provided 10 classes via teleconferencing with Pike County: classification (2 classes); reptiles, dinosaurs, Kentucky animals, endangered species, tropical rain forest (2 classes); reptiles and amphibians, and feathers and fur. A second series with nine classes was presented during the fall of 1997, with the topics being essentially the same as the first series.

The availability of the teleconferencing equipment gave students the opportunity to experience real-life applications to what they had been studying. It gave the Louisville Zoo the opportunity to educate students who could not normally come to the zoo and built a much stronger link between the zoo and Pike County. Also, it gave the incentive to a few classes to visit the zoo. In fact, at least one of the classes was put on a video, which was shown on a TV station in West Virginia. On the basis of the video, a class from West Virginia took a field trip to the Louisville Zoo, and drove right by the Cincinnati Zoo, (a much closer zoo with good facilities) in order to get there. The shows also provided the opportunity for the Curator of Education to demonstrate the possibilities of this new equipment to senior staff at the zoo.

Impact of TIIAP Support on the Initiative

The project director said that TIIAP "primed the pump." Without the federal money, the cabling project would not be nearly as far along as they are.

EVALUATION AND DISSEMINATION

Evaluation

In the TIIAP application, Project RUN included three components in its evaluation. Component 1, the effectiveness of reaching stated goals, would be shown by the following list of data items:

a. percentage of potential access points connected

b. percentage of access points that will be provided access by the completion of the project

c. percentage of access points that can be cost justified

d. percentage of potential access points that have access to all services

e. average number of hours of use for each mode of communication per access point

f. average number of hours when multimedia (multimode) communication is utilized

g. percentage of teachers, students, and citizens requesting access, that have access

h. percentage of teachers, students, citizens requesting access, that will be provided access by the completion of the project

i. number of other cities and states to which distance learning links have been established and have been requested

j. percentage of requested links that have been established

k. average hours of usage of external links

l. number of other on-line services connected via gateways

m. number of other on-line services to which gateways have been requested

n. percentage of gateways that have been established

o. number of businesses and institutions of higher education providing peer-to-peer access which can be accessed by teachers, students, and community members

p. percentage of requested peer-to-peer accesses that have been established

q. number of learners with special needs that could have and have been provided alternative methods of delivery of instruction

r. percentage of potential learners with special needs that have been provided alternative methods of delivery of instruction

s. number of workers who require retraining that have been and could have been provided alternative methods of delivery of instruction

t. percentage of potential workers who require retraining that have been provided alternative methods of delivery of instruction

The second component of the evaluation, suitability of selected technology for future applications, focuses on "bandwidth on demand." The mechanism for determining this would be that users would be able to depend on the availability of the services at all times. The third evaluation component is "quality and effectiveness of new applications and services." It was expected that the "education process" would be greatly transformed by the facilities and services provided by the project. No details about what would be evaluated were included. A qualitative approach was proposed and instruments would include student evaluations, participant interviews, participant surveys, program records, and doctoral research papers.

Work on the evaluation had not been started at the time of the site visit. The voice and data communications specialist was about to develop an answer to each question on the list. The bulk of the evaluation activity was scheduled to occur March 9-10, when the expert consultant would be visiting and conducting some surveys.

Dissemination

Articles about the classes provided by the zoo via teleconferencing equipment have appeared in Trunkline and the JCPS publication, *Homeroom Connections*. JCPS staff have made a presentation at the Kentucky

Education Technology Conference (KETS) each year. The curator of education for the zoo and a staff person from Pike County presented at KETS in March 1998.

LESSONS LEARNED

- Sharing resources can avoid duplication of expensive cabling costs. For each section of the cable, the partners had to decide whose budget would be used to install and later maintain it. Working this out in advance took time and careful negotiation, but it was worth it in the end.

- The political and legal aspects of the project rather than the technical produce the main problems. This was the prediction given by the expert consultant to the planning grant, and staff said that it proved to be very accurate.

- Installing the fiber optic cable only takes 6-8 weeks. Getting the contract signed is what takes the time.

- Read legal contracts very carefully. Legal counsel is needed.

FUTURE PLANS

- The school district and its partners will continue to install fiber optic cable. In 5 years, the district hopes to have a LAN in all local schools and about 100 of the 150 schools on fiber optic cable.

- The library expects to be completed rewired internally by April 1998. In conjunction with the wiring, 50 computers are being installed each week over an 8-week period.

- At the time of the site visit, the library had just received a grant for Metroversity. It will connect to the catalogs of other libraries, including some in southern Indiana, via the web.

- Future ideas in which the zoo and Pike County may participate are having the zoo education department provide workshops for teachers in Pike County, using video from the zoo, providing live telecast from the zoo, and giving live "Behind-the-Scenes Tours via teleconferences in parts of the zoo such as the islands area, the elephant house, and the HerpAquarium.

- Additional government agencies (police, fire, emergency medical services, and the public works department) as well as nonprofits groups (e.g. the three campuses of the University of Louisville) will be added to the network. (The Kentucky information highway is not permitted to provide commercial services.)